


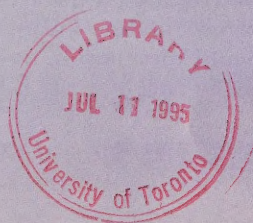
CA20N
TR 80
-C75

Government
Publications

CUESTA

 The Niagara Escarpment Magazine

1995





Minister's Greetings

I am very pleased once again to bring greetings to Cuesta readers as minister responsible for the Niagara Escarpment Program.

The last few months have been an exciting time for the program. In June 1994, the Five Year Review of the Niagara Escarpment Plan wound up with my

announcement of the new, revised Plan approved by Cabinet.

We all have reason to be proud of the 1994 Niagara Escarpment Plan. It keeps in place the fundamentals of the original Plan, but also reinforces its environmental protection thrust with additional provisions for maintaining the Escarpment's natural environment.

The Five Year Review involved a lot of hard work by countless individuals. I want to thank the Niagara Escarpment Commission, its staff and the staff of

provincial ministries for a job well done. But as much as them, I need to recognize the invaluable contributions of all the members of the public who gave untiringly of their time so that we might have the best possible Niagara Escarpment Plan.

Then last fall, my ministry hosted the first ever conference about research on the Escarpment called "*Leading Edge '94*". The conference, which linked scientific research, policy-making and community interests, was a great success. Proceedings from the conference will soon be available and there have been numerous requests to make the conference an annual or biennial event.

Interest in the Escarpment is at an all-time high. Thank you for your interest, and best wishes.

Bud Wildman

C.J. (Bud) Wildman, Minister of Environment and Energy



Chair's Message

In a wry reference to why people ought to take care of the land, American social critic Will Rogers once said: "They're not making any more of it."

By stating the obvious, Rogers captures the ultimate reason for taking care of the land we have: it's the only land we'll ever have.

Individually, we adopt the role of stewards, mindful we borrow from our children and grandchildren. It's the only land they'll ever have, too.

In our society, we express this responsibility as a public duty. We regulate land use "in reference to the general welfare," notes Ralph Krueger, geographer and Grey county landowner.

Interestingly, Dr. Krueger also observes that it's not just the community that gains by striking a balance between personal and communal benefits. "Properties with protected environmentally sensitive areas have increased, not depreciated, in value."

Of course, protection of land in regions where there are intense development pressures will always be

contentious. But protection leaves open both options for the future — to develop, if that development is judged compatible with the protected natural landscape; or to continue to protect.

Land protection does not mean fencing it off and, sealing it from any human enjoyment. Protection can provide for a myriad of activities, some of which are described in these pages — probing the biological environment of alvars (limestone flats) on the Bruce Peninsula, understanding the Escarpment's aboriginal past through geology, and the excitement and challenge of climbing the cliff face.

What do we want our Escarpment to look like a hundred years from now? As we enter a more mature period in the life of the Niagara Escarpment Plan with the Five Year Review behind us, we need to cast our sights that far ahead — to how we care for the land so that, in a century, there is still a natural Escarpment left for all to enjoy.

Joan Little

Joan Little, Chair



Contents

2

Escarpment Outlook

Make a difference; Flooded cave passage; World acclaim for Escarpment; "Leading Edge '94" forum; New Plan released.

4

Nature's Rock Gardens

Life springs from bare rock alvars on the Bruce Peninsula.

By Claudia Schaefer



8

Tracking the Hunters

An archaeologist uses geology to recreate human occupation in Ice Age Ontario.

By Peter Storck



11

Liquid Asset

The water of the Escarpment keeps three industries afloat.

By Lorraine Brown



14

PEAK EXPERIENCE

The Escarpment gives rise to rock climbers.

By Lorraine Brown



CUESTA Originally a Spanish term meaning flank or slope of a hill, in geological terms means a ridge composed of gently dipping rock strata with a long gradual slope on one side, and a relatively steep scarp on the other

♻️ This paper contains 10% post-consumer waste & 50% pre-consumer waste
Printed using vegetable based inks

Front cover: Willy Waterton, "Bruce Peninsula National Park Shoreline"

Editor: Richard Murzin • Assistant Editor/Art Director: Susan Powell

Cartography & Reprographics: John Novosad and Colin Mandy

Cuesta is an annual publication of the Niagara Escarpment Commission
Niagara Escarpment Commission

232 Guelph Street, Georgetown, Ontario
Canada L7G 4B1

(905) 877-5191 or (905) 453-2468



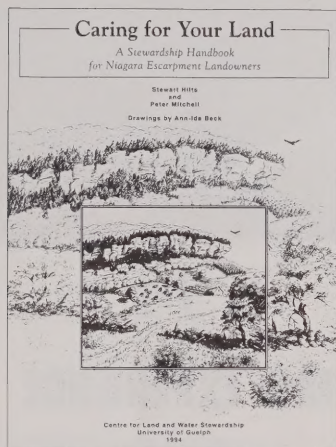
Ontario

.....Story Location
.....Niagara Escarpment Plan Area

Make a difference, help yourself

Two new books are aimed at helping people protect, conserve and improve their properties and communities.

The University of Guelph has published a 54-page book called Caring for Your Land, a



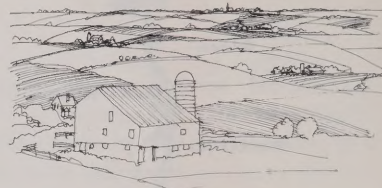
stewardship handbook for Niagara Escarpment landowners.

It's a practical guide for rural landowners on the Escarpment who are interested in actively caring for their land. Set up as a self-help primer for ecological planning, it includes advice and action tips for woodlands, wetlands, streams, ponds, homesteads and more.

Copies are available for \$10 from the Centre for Land and Water Stewardship, Richards Building, University of Guelph, Guelph, Ontario, N1G 2W1. Phone: (519) 824-4120. Leave a message at extension 8329.

The Conservation Council of Ontario has just published the 87-page Saving the Countryside - - Conserving Rural Character in the Countryside of Southern Ontario.

"The extent and pace of change in the countryside threatens the features of rural character that most attract us," says author Brian Byrnes. "Sometimes we don't recognize or understand what we



SAVING THE COUNTRYSIDE

CONSERVING RURAL CHARACTER
IN THE COUNTRYSIDE OF
SOUTHERN ONTARIO


BY BRIAN BYRNES

PUBLISHED BY THE CONSERVATION COUNCIL OF ONTARIO



value about our community until it's lost."

Get your copy for \$15 from the Conservation Council of Ontario, #506-489 College Street, Toronto, Ontario M6G 1A5. Phone: (416) 960-9637.

Both books are filled with illustrations and include helpful do-it-yourself projects in the form of worksheets and discussion group questions. 

Flooded cave passage is longest in Ontario

The crevices and caves of the Bruce Peninsula play some interesting tricks with the area's water supply. In a field behind the St. Edmund's museum south of Tobermory, a stream suddenly disappears into a small crack in the bedrock. Two and a half kilometres to the northeast, a stream emerges from the Escarpment to enter Georgian Bay at Little Cove. Could this be the same stream?

In 1990 and 1992, hydrogeologist Marcus Buck carried out tracing experiments using fluorescent dye. He determined most of the underground stream's route, though its ultimate destination


remains uncertain. Most of the stream's water probably emerges as a spring somewhere under the surface of Georgian Bay.

Since 1990, cave divers have been exploring this subterranean waterway known as the St. Edmund's Cave System, setting finned feet on places never before seen by humans. They enter at Leopard Frog Cave and have explored it to a length of 1.2 kilometres, the longest known cave passage in Ontario.

Fred Upton, a diver from Chesley, recently negotiated the cave with a video camera and showed the film to the Owen Sound Field Naturalists last fall. (People with a tendency to claustrophobia

had to leave the room.)

Upton's camera captured a murky, dark world of swirling sediments and gloomy, featureless cave walls. In places, the divers squeezed through openings only 35 centimetres (14 inches) wide, holding onto a rope and pushing their air tanks ahead of them.

In spite of the cold and dark, the caves support life. There are leeches galore, small minnows near the entrance and one diver saw an albino salamander. The cave is named for the leopard frogs that have been seen sitting on ledges above the water level. 

World acclaim for Escarpment

Ontario's Niagara Escarpment has been getting international recognition lately, building on its 1990 designation as a UNESCO biosphere reserve.

A government delegation from the Mexican state of Aguascalientes visited Ontario last autumn to study the Niagara Escarpment Plan. They were working on a special land use plan of their own to protect natural areas in their region. As a result of their visit, Aguascalientes is using the Niagara Escarpment Plan as their model, above several other plans they looked at.

The work of the Niagara Escarpment Commission cartographers has been singled out for international exposure by the Canadian Cartographic Exhibit Committee.

Two maps have been selected — a fold-out of the Niagara Escarpment Parks and Open Space System and a map of the Bruce Peninsula. They will be displayed at the 1995 International Cartographic Association conference in

Barcelona, Spain and at the 1996 International Geographic Union meeting in The Hague, Netherlands. After that, they become part of the National Map Collection of the National Archives of Canada.

Most recently, the Niagara Escarpment was chosen by UNESCO as one of 24 biosphere reserves (out of the global total of 324 reserves in 82 countries) to have a paper presented at the International Conference on Biosphere Reserves in Sevilla, Spain. The Commission's paper, titled "Ontario's Niagara Escarpment: Implementing the Biosphere Reserve Concept in a Highly Developed Region," was presented at the conference in March.

The paper traces the history of the Niagara Escarpment Plan, explains how the Plan works, and examines the competing pressures for environmental protection and development in the Niagara Escarpment Plan Area. Copies are available from the NEC at (905) 877-5191, Toronto line (905) 453-2468, or by writing the NEC at 232 Guelph Street, Georgetown, Ontario, L7G 4B1. 📄

"Leading Edge" forum attracts 150

For the first time ever, planners, community groups, politicians and industry representatives were invited to learn about the latest research on the Niagara Escarpment.

The Leading Edge conference attracted more than 150 people to the Hockley Valley Resort near Orangeville at the end of October 1994.

Globe & Mail columnist Michael Valpy moderated the conference which included concurrent sessions and a panel discussion on the last day. There were no limits on the subjects presented at the conference. The plight of Massasauga rattlesnakes shared podium time and poster space with research on pit and quarry rehabilitation.

Organizers are already talking about holding a follow-up conference in October 1995 to bring together scientists and Escarpment community groups. A complete summary of the conference, including more than 60 research papers, is available. For more information contact:

Sue Powell (NEC), (905) 877-5191 or Maria Alles-De Vos (MOEE), (416) 440-3705. 📄

< New Plan Released

A revised Niagara Escarpment Plan was released last June in front of an audience of 200 people at the Ontario Agricultural Museum in Milton. Showing support for the Plan, Environment and Energy Minister Bud Wildman and Health Minister Ruth Grier display the new Plan, flanked by MPP Norm Sterling (left), formerly minister responsible for the Escarpment, and MPP Ron Eddy (right). 📄



Photo: Tessa J. Buchan

Nature's Rock Gardens

Story & Photos
By Claudia Schaefer

Walk out of the forest into the clearing of an alvar and you step into a different world. Almost none of the plants you saw in the woods would dare set root here.

The alvar is a habitat for the hardy. Survivors claw life from bare rock, pounded by the elements, flood and drought.

Alvars are flat, open areas with limestone or dolostone close to the surface. Although sometimes referred to as barren land, they're far from it.

*"The alvar is a habitat for
the hardy."*

The tree canopy is sparse, but the alvar's shallow soils and exposed rock are home enough for tough grasses, wildflowers, algae, lichens and mosses. Some species are provincially and nationally rare.
(see page 6)

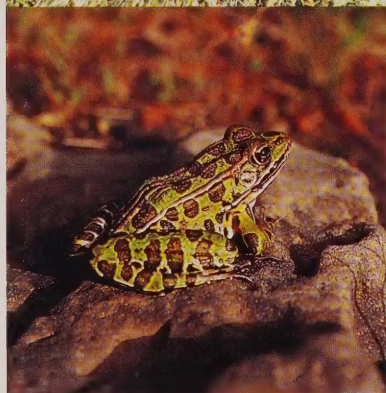


Above: Colour combinations on alvars change month to month in spring and summer. Red and white predominate in early spring. The red flowers are Indian Paintbrush (*Castilleja coccinea*), the white are Bluets (*Hedyotis longifolia*).



Left: Alvars are the habitat of choice for the Eastern Massasauga rattlesnake (*Sistrurus catenatus*).

Inset: There is an ample food supply, particularly of the hopping green variety such as the Leopard frog (*Rana pipiens*).



This orange "moss" is actually an algae, *Trentepolia* species. It gets its colour from orange fat bodies.



While many alvars are painted red in spring with Indian Paintbrush (*Castilleja coccinea*), they are also dotted with the distinctive flowers of Selfheal or Heal-all (*Prunella vulgaris*). Indian Paintbrush on the peninsula is almost always red; on Manitoulin Island, most are yellow.



Above: This Pitcher Plant (*Sarracenia purpurea*) is not a typical alvar species but shows the ability of some plants to survive on practically bare rock.

Left: Standing water provides suitable conditions for Swamp Milkweed (*Asclepias incarnata*). Fritillary butterflies (*Speyeria spp.*) feed on its nectar.

In fact, alvars themselves are rare. The Nature Conservancy of Canada has designated them globally imperilled. In Canada, they occur only in southern Ontario, concentrated at the edge of the Canadian Shield, on Manitoulin Island and on the Bruce Peninsula.

Most of the alvars on the Bruce Peninsula are dolostone pavement flats with extensive areas of solid, exposed bedrock.

*"These habitats are
very much a part
of our
natural heritage."*



Lichens and mosses seem to predominate but the most common type of life may actually be algae. Dolostone is usually white, yet alvar rocks are dark grey or black. They get their colour from a microscopic algae (mostly *Gloeocapsa alpina*) that coats the bedrock.

Until fairly recently, some people thought alvars were a product of cutting and clearing during European settlement.

Research has shown, however, that some alvars support trees that have lived for hundreds of years. These habitats are very much a part of our natural heritage.

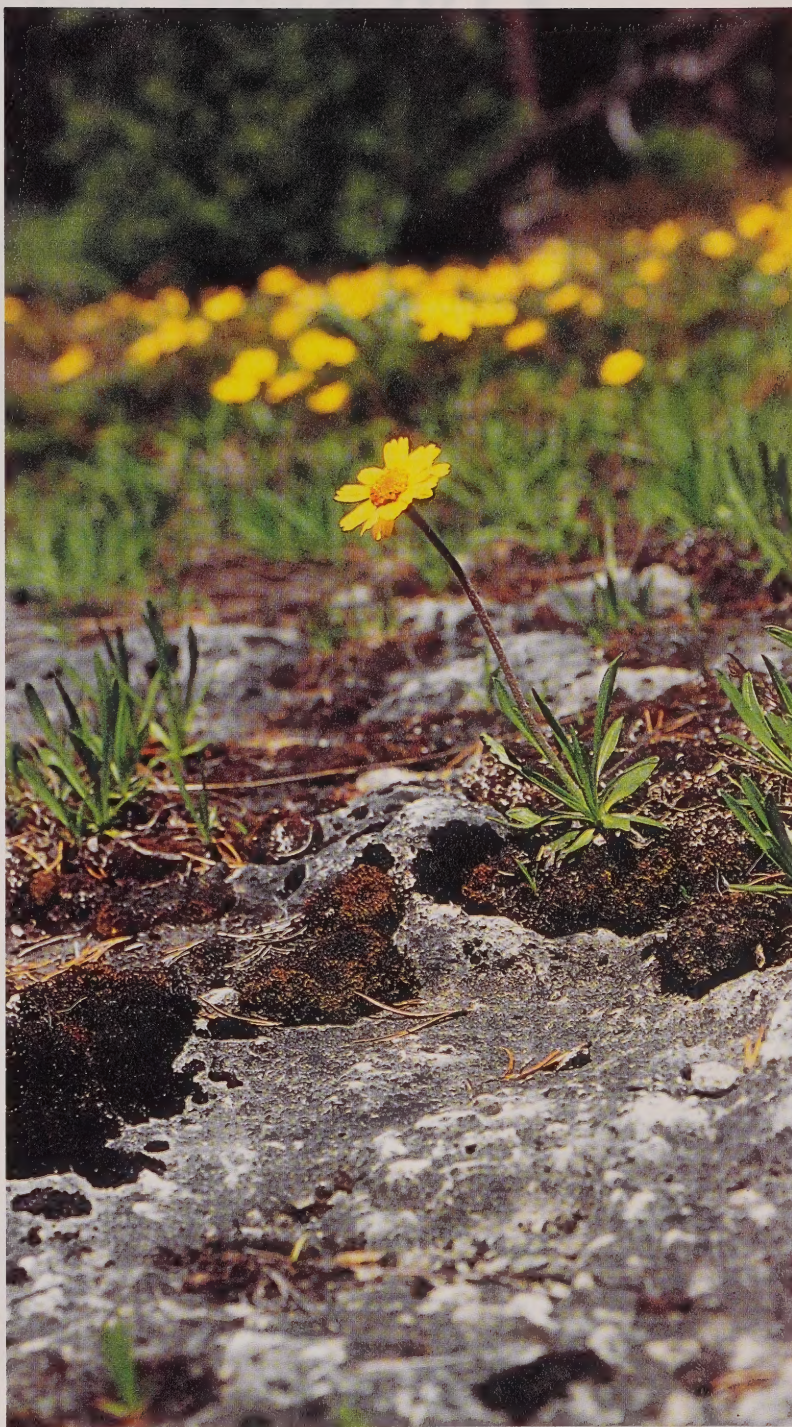
Their longevity under often brutal conditions doesn't guarantee their future, though. The trees and habitat face a deadly predator against which they have no natural defences; bonsai collectors.

While most enthusiasts obtain plants from ethical sources, rogue collectors uproot ancient trees from the flats. 🌱

Claudia Schaefer is a Masters Student with the Cliff Ecology Research Group at the University of Guelph. Her research on alvars is supported by Parks Canada and the Federation of Ontario Naturalists.



Blue-eyed grass, (*Sisyrinchium mucronatum*) lends a blue tint to the alvar in spring. The "grass" is actually in the Iris family.



From a global perspective, Lakeside Daisy (*Hymenoxys acaulis*) could be the rarest plant in Ontario. It's found in only a couple of locations outside the province. The healthiest populations are found on dolostone pavement flats of the Bruce Peninsula and Manitoulin Island.

Tracking the hunters

An archaeologist uses geology to study human occupation in Ice Age Ontario

By Peter Storck

"How do you know where to dig?"

As an archaeologist, this is probably one of the most frequent questions I am asked. After twenty-five years of field work, I am still trying to puzzle out the solution.

The problem is more difficult the farther back in time you go. This is because the world we see today is quite different from that of 10,000 to 12,000 years ago when hunter-gatherers called Early Paleo-Indians first migrated into the province at the end of the Ice Age.

These are the people and time period that most interest me. Unfortunately for me, Early Paleo-Indians were highly mobile and left little behind. As well, the few traces of their passing have been buried or destroyed by erosion, decomposition, modern human activity and other agents of change. It is very difficult to find sites for archaeological investigation.

One of my earliest efforts to find a way to discover Early Paleo-Indian sites concerned the Niagara Escarpment. The first clue came from New England where fragments of bone — possibly from caribou — were recovered

from two or three Early Paleo-Indian sites.

Since the late glacial environment in the Great Lakes region (a mosaic, through time and space, of tundra, spruce parkland, and conifer forest) may have been broadly similar to that of the northeast United States, I reasoned that people in Ontario may also have hunted caribou.

My second clue came from the observation that the Niagara Escarpment is a pronounced barrier to east-west movements across the southern part of the province. I speculated that if caribou moved in large herds across the escarpment, they would probably have moved through the major gaps, such as the Dundas valley near Hamilton, the Campbellville gap near Milton through which Highway 401 passes, and the Boyne and Pine River valleys northeast of Shelburne. If so, these concentrated animal movements may also have attracted hunters.

I explored this idea for several years in the early 1970s. Although I re-discovered the beauty of nature in a thousand ways or more, I found the barest trace of late Ice Age hunters, a few isolated spear points that I



presume had been lost during the hunt or cross-country travel.

Early Paleo - Indians may have been attracted by caribou moving through gaps in the Niagara Escarpment. The Escarpment also provided stone for tools.

Because this approach didn't seem to be going very far, or very fast, I turned to another approach — walking the former beaches of glacial lakes. This "beachcombing" led to the discovery of a large number of sites off the Escarpment, some of which I excavated over a period of several years.

In the late 1970s, a new problem took me back to the Niagara Escarpment, this time with a geological colleague from the Royal Ontario Museum, Peter von Bitter. We decided to try to determine where Early Paleo-Indians obtained the white stone (a glass-like substance called chert) that some preferred for tool manufacture.

This toolstone was used widely over an area of perhaps



30,000 square kilometres in southern Ontario. We thought, however, that it must have come from a much more concentrated geological source.

After several years of looking, Peter finally found the source of the toolstone in a small area in the Kolapore Uplands in the Blue Mountain region, southwest of Collingwood. The moment he chipped a piece of this white chert from "living" rock (bedrock) he provided me with evidence that Early Paleo-Indians moved periodically (perhaps seasonally) between the Kolapore Uplands and other areas of the province.

Clearly, these people were not the unrestrained wanderers that many archaeologists had thought. Equally significantly, I suddenly had a new approach for discovering Early Paleo-Indian sites.

Searching for evidence of prehistoric toolmaking along outcrops containing white chert was immediately successful. On the very first day I found a huge site used by Early Paleo-Indians

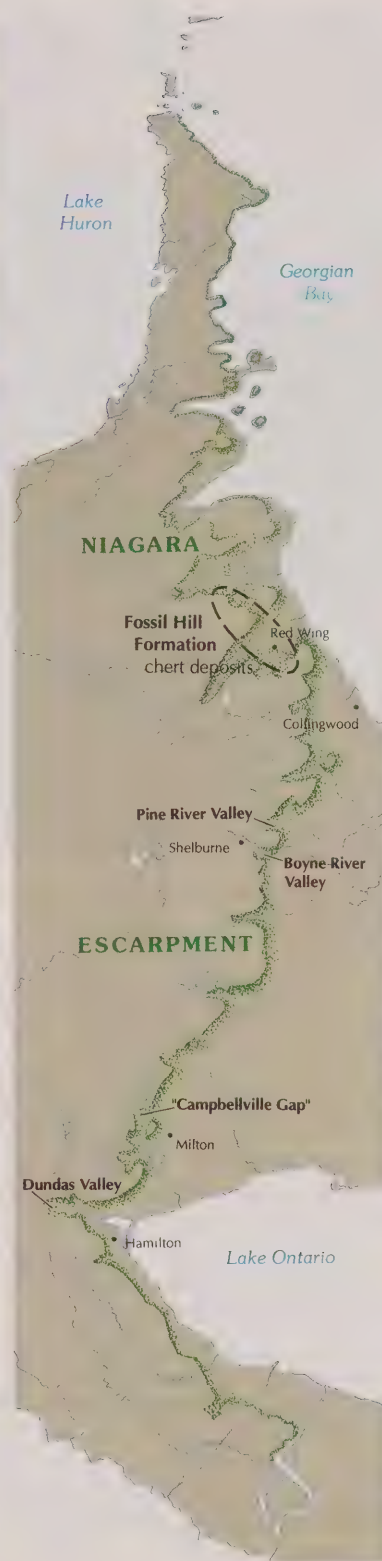
Above: The Bronte Creek gap at Mount Nemo near Milton. The movement of large herds of caribou through gaps in the Escarpment may have attracted hunters.

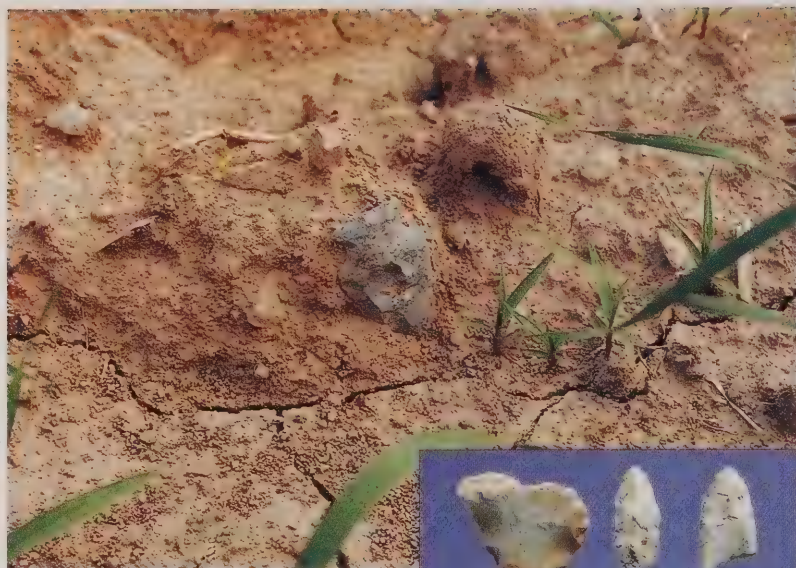


Artist: Ivan Kocsis

Above: Artist's reconstruction of Early Paleo-Indian caribou hunting.

Right: "Gaps" in the Escarpment.





Above: Example of an artifact in place, a side-notched spear point from the post-Paleo-Indian time period.

Inset: Fragments of prehistoric tool blanks and heavily reshaped Early Paleo-Indian spear point.

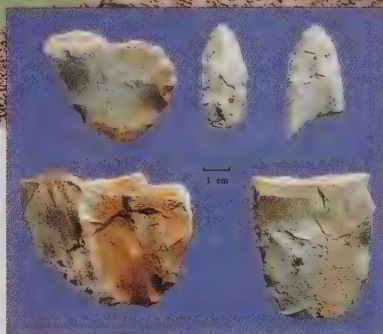


Photo: Bill Robertson

as a source of toolstone. Here, they broke the stone into blanks for making tools, similar to our concept of making keys from key blanks.

Now that we knew where they obtained the stone, the next question was: How? How did they first find the stone? And, secondly: How did they obtain it? Did they only visit the area for short periods — perhaps as special task groups travelling from base camps located elsewhere — or did the entire band visit the chert source and actually live there for a time?

A somewhat related question is: When did they do this? In the spring, or summer, or in the fall before the snows? And finally: How did they survive in the harsh tundra or spruce parkland environment of the Kolapore Uplands?



Above: Naturally exposed chert near Red Wing, Grey County. Chert appears as a white layer in the bedrock.

I continue to be amazed by this white stone. It is nearly 400 million years old, unimaginably distant in time from the people who used it. Yet, it was vital for tools and, thus, the source of life for Ice Age people. It is surprisingly revealing about their lives. Ten thousand years before our own time. 🐾

Dr. Peter L. Storck is a curator in the New World Archaeology Department, Royal Ontario Museum.



Above: Archaeological field work near Red Wing. The buried chert beds were tilted out of horizontal by glacial ice. Photo: Peter Storck

Liquid Asset

By Lorraine Brown



Photos: Willy Waterton

Bottled, it is sold from the Caribbean to the Far East. It produces delicious rainbow trout for Toronto's best restaurants, and is the primary ingredient in some of Ontario's premium ales and lagers. It provided Canada with its first tourist attraction. The Niagara Escarpment's water is without question one of its biggest assets.

Water and the Escarpment are closely linked. Rivers plunge over the cliff face, creating waterfalls ranging from the mighty torrent of Niagara to tiny, unnamed cataracts sprinkled across Grey County. Springs trickle from the Escarpment face. Streams mysteriously disappear beneath the bedrock on the Bruce Peninsula, to re-appear hundreds of metres or even kilometres

away. Water even penetrates into the very rock itself. Crack open a piece of Escarpment limestone, and what do we find? Algae that need water to survive.

The groundwater resources of the Escarpment provide drinking water for hundreds of thousands of people. They also provide a living for some.

The Escarpment was created mainly by water, shaped as it is by the relentless, erosive action of rain and ice, working their way into minute cracks in the porous

limestone and breaking the rock apart in the processes of mechanical and chemical weathering.

Like all areas, the Niagara Escarpment has surface water in lakes and rivers and groundwater hidden away underground. In the southern and middle sections of the Escarpment, glacial deposits of sand and gravel hold and filter water as it moves through the ground.

These water-bearing geological deposits are called aquifers if they contain enough water to produce continuous supplies.

Throughout the Escarpment,

Above: Fly fishing below Hogg's Falls. The Escarpment area provides 2.8 million fishing days annually, 17% of Ontario's sport fishing.



Top: Warren Darling loads spring water for Creemore Springs Brewery.

Inset: Gordon Fuller, vice-president of brewing, examines a glass of beer for clarity.

particularly on the Bruce Peninsula, the glacial deposits thin out or disappear entirely. Here, groundwater moves through fractures and caverns in the rock; the limestone bedrock is in itself an aquifer.

The groundwater resources of the Escarpment provide drinking water for hundreds of

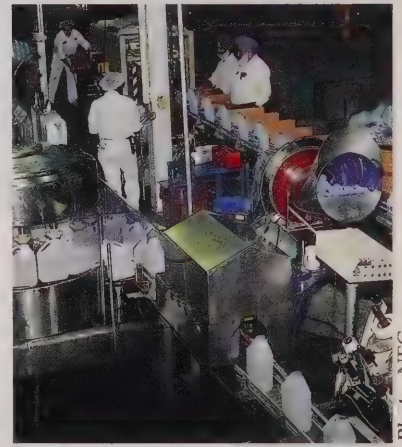
thousands of people. They also provide a living for some. From Halton Region to Grey County, Escarpment springs are a continuous supply of cold, clear water that is the basis of three important industries: fish farming, bottled water and beer-making.

At Holland Centre near Chatsworth, Alvis Fogels and Susan Barker run a trout farm that supplies fish to Toronto hotels and restaurants. Their property has

We know next to nothing about how human activity above the ground affects water resources underground.

six springs that emerge between the blue clay shale of the Queenston Formation and the dolostone rock above it.

Small dams at each spring impound the water. From there it is piped down to the buildings in which the fish are raised. "The



The bottling line at Crystal Springs. The company sells its premium-quality water throughout North America.

water is a bit too cold for rainbow trout", says Susan Barker. "It never goes above 10 degrees Celsius and fish would grow faster at 15 degrees. But its quality is high".

The Halton Hills Trout Farm near Acton diverts 120 gallons per minute from the Guelph-Amabel aquifer, partly from springs and partly from wells. The water is pumped into fish raceways, then



Water trickling and seeping from Escarpment rock creates fantastic ice caves at Bruce Peninsula National Park.

back to nearby Sixteen Mile Creek. Other trout farms such as Aquafarms at Feversham and Fiddlehead Trout Farms near the Forks of the Credit take advantage of Escarpment springs.

Niagara Escarpment spring water has also spawned a burgeoning bottled water industry.

Crystal Springs takes its water from a spring near Cataract in Caledon. The original source for the Canada Dry Company, this spring has been providing beverage mineral water since 1883. Today, Crystal Springs water is exported all over the world.

Terry Drayton of Crystal Springs says the geological conditions on the Escarpment are just right for producing good mineral water. "The shallow formations with a good mix of sand, gravel and limestone, and solid bedrock underneath, are perfect," says Drayton. "The calcium and magnesium levels in the water are ideal, at two to four

parts per million, and there is no iron or salt."

The owners of Crystal Springs want to maintain the high quality of their springs. They are now participating in a public hearing to fight a proposed pit that could be located about 500 metres from their main spring.

They fear that an event like a gasoline spill could contaminate the water for years, and jeopardize their business. They're also concerned that removing the sand and gravel, which acts as a filter, would change the quality of their water.

Good water also makes



Alvis Fogels dips for Rainbow trout at Springhills Trout Farm, Grey County.

good beer. The Cataract spring supplies the Upper Canada brewery, while further north, at Creemore, another Escarpment spring provides water for the brew known as Creemore Springs. Creemore and Upper Canada are premium beers. Their makers proudly claim that only four ingredients go into their beer: water, hops, malt and yeast. With water making up 97% of the product, both companies insisted on the best possible water, with the right combination of minerals, and no salts or contaminants to produce off-flavours.

But can we take away increasing amounts of water without affecting the aquifers? Many people wonder if the boom in bottled water could be sucking our aquifers dry. In Grey and Bruce Counties alone, there are sixteen permit holders who can take up to ten million litres (2.2 million gallons) of water daily from the area's aquifers. The

recent, mysterious one-metre drop in the level of Brewster Lake, a spring-fed lake in Osprey Township south of Collingwood, has many residents pointing the finger at a local bottler which gets its water from a source seven kilometres away. Ministry of Environment & Energy officials think it is unlikely that water-taking is at fault, but they are investigating. Don Beckett of the Ministry of Environment and Energy says that permits are issued only after hydrogeological studies indicate that water-taking will not have an adverse impact on water supplies in the area. If there are any complaints, the amount taken can be reduced or the operation can be shut down entirely.

Beckett and his colleague Theo Beukeboom, a hydrogeologist with MOEE, agree that the biggest threats to groundwater along the Niagara Escarpment are not water-taking, but other

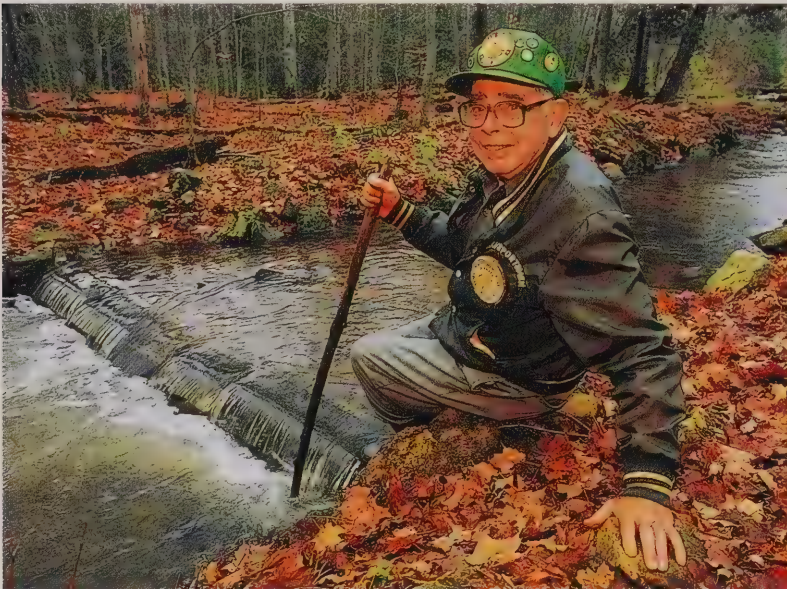
impacts such as inadequate septic systems, poorly planned subdivisions, road salt, golf courses and intensive farming practices. This is especially true at the northern end of the Escarpment, where shallow soils offer little protection to fractured bedrock aquifers.

A highly controversial subdivision near Owen Sound was stopped a few years ago when regulatory agencies reported that the development's septic systems could have a negative impact on water quality in the nearby Spey River. North of Owen Sound, in the village of Shallow Lake, inadequate, old septic systems contaminated well water two kilometres away.

The Niagara Escarpment Commission (NEC) has teamed up with MOEE and Credit Valley Conservation on a study this summer to learn more about the impact of a variety of activities, particularly the building of ponds, on the Escarpment's precious water resources.

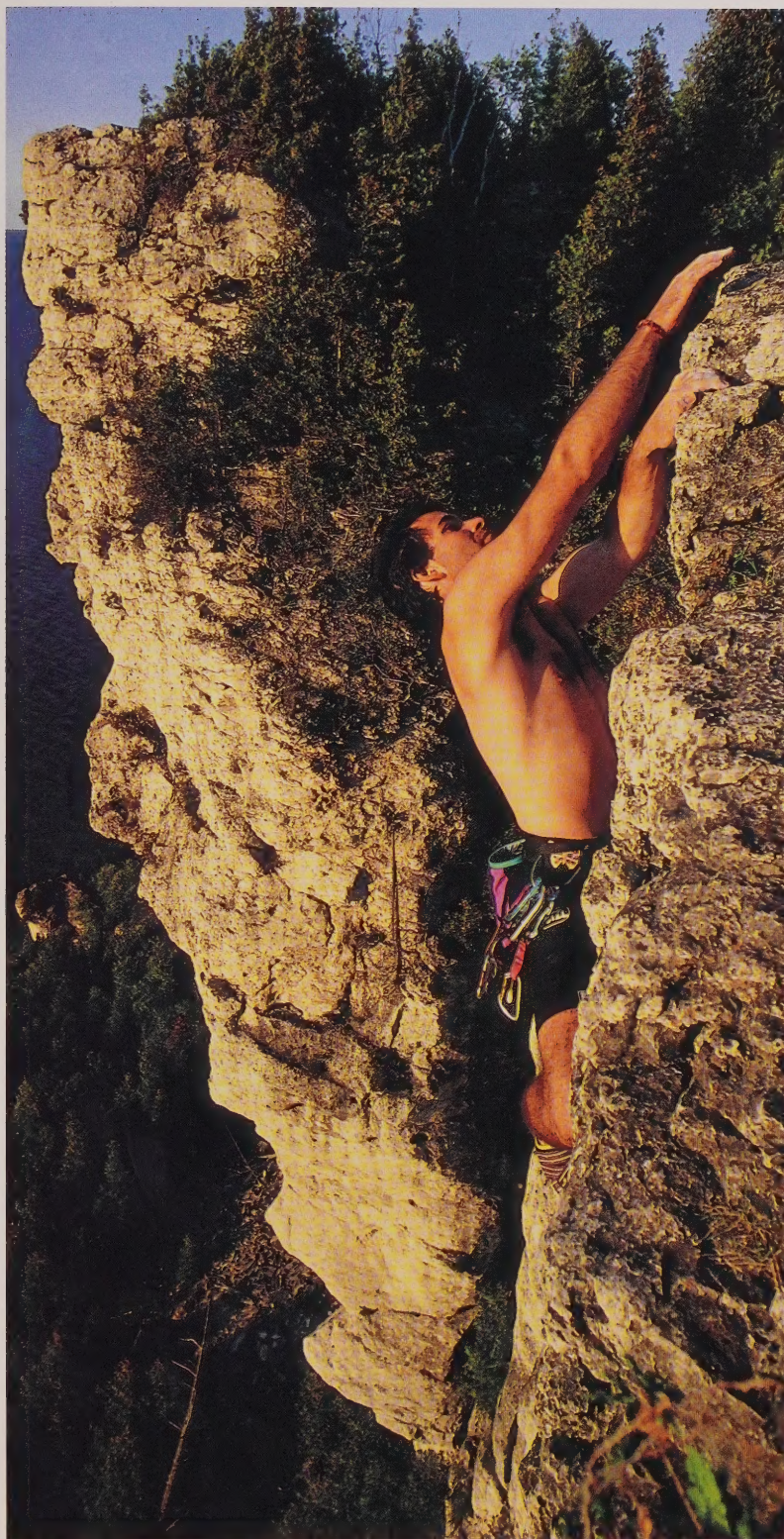
"We know next to nothing about how human activity above the ground affects water resources underground," says NEC Planner Debbie Ramsay. "We can't live without water, yet we know very little about how water systems behave and how to protect them."

Until we know more it's probably a good idea to be cautious with development where water could be affected, particularly on the Niagara Escarpment, a known recharge area for our drinking water, she says. "We don't know how many little changes it takes to add up to a large-scale, perhaps irreversible, crash." 🐼



Os McArthur, "Mr. Brown Trout" sits beside one of the spawning channels he helped build on the Sydenham River near Owen Sound with the Sydenham Sportsmen's Association and the Grey Sauble Conservation Authority.

Lorraine Brown is a writer living in Leith, Ontario.



PEAK EXPERIENCE

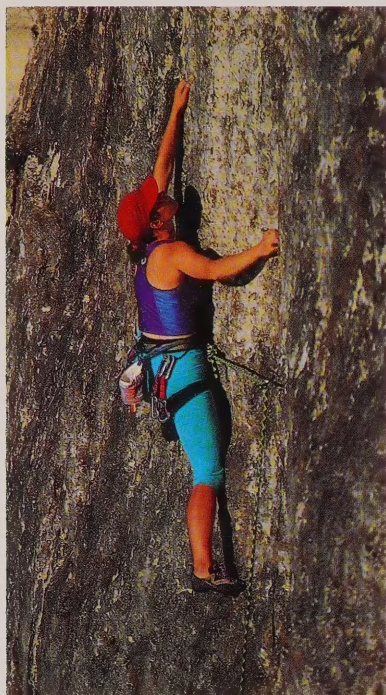
Story By
Lorraine Brown
Photos By
Willy Waterton

Judy Barnes and Chris Oates have visited many of the world's top climbing areas in Britain, Europe, and the United States. Yet their favourite climbing spot is still Lion's Head on the Bruce Peninsula.

The hike to the cliff along the Bruce Trail leaves less serious climbers behind. At sunset, the rock face turns golden and the aquamarine waters of Whippoorwill Bay far below catch the last rays. Lion's Head also offers a challenging and unusual climb known as a hanging belay.

Climbers rappel down from the top to get to the start of the climb, which begins mid-way up the rock face. "You feel like you're out in space, with nothing below

Left: Chris Oates reaches for the top. In the background, Eastern White cedar trees cling for life on the cliffs. Climbers are becoming more careful about the environmental impact of their sport.



Get a grip. Judy Barnes tackles a wall of rock. Barnes has climbed some of the world's best cliffs but Lion's Head remains a favorite.

your feet," says Judy Barnes. "Lion's Head is an amazing place to climb."

Since 1989, growing numbers of rock climbers have been discovering the Niagara Escarpment. On weekends, it's not unusual to find two hundred climbers at Rattlesnake Point and Buffalo Crag, Halton Region Conservation Authority properties near Milton. A climber can easily spend a day there, negotiating the easier climbs in half a minute, the harder ones in five to ten minutes.

Until recently, climbing was a difficult, risky sport. But improvements in techniques and equipment, as well as the availability of lessons and indoor climbing walls, has made climbing as accessible as hockey or gymnastics, given proper

instruction. Even people who are not athletic can learn to climb. Kids, to whom climbing comes naturally, really take to the sport.

The first Escarpment climbers were European immigrants who climbed at Kelso and Mount Nemo after the second world war. Austrian climber

THE ESCARPMENT OFFERS SOME OF THE BEST CLIMBING IN NORTH AMERICA.

Helmut Microys developed routes at Metcalf Rock near Collingwood and Barrow Bay on the Bruce Peninsula. Then, as the sport blossomed in the late 1980s, an explosion of route development focused climbing in three areas: Milton, the Beaver Valley, and the Bruce Peninsula.

Although climbing routes on the Escarpment are short compared to, for example,



A bundle of carabiners (snap-links). They are attached to lead stoppers, nuts, pitons or bolts in the cliff face.

Yosemite's El Capitan, a smooth, vertical granite spire over two kilometres high, they are more demanding athletically. "When it comes to short, gymnastic style climbing, the Escarpment offers the best in North America — maybe even the best in the world," says Chris Oates.

There are two styles of rock climbing: traditional and European or sport climbing. Both are used on the Escarpment. In traditional climbing, climbers place lead stoppers or nuts in fractures in the rock as protection against falling, and clip their rope into them with carabiners (snap-



Preparing to climb. Judy Barnes and Chris Oates put on climbing shoes.



Hanging on. A climber is dwarfed by a sheer cliff face at Lion's Head.

links) as they ascend. A belayer on the ground below feeds out the rope as required. When the first climber reaches the top, the belayer follows, removing the hardware en route.

In sport climbing, pitons or bolts are drilled into the rock face permanently. Climbers move from bolt to bolt, clipping on with carabiners. When they reach the top, they descend by the same route. There are still many traditional routes on the Escarpment. But as climbers seek out more demanding climbs on smoother rock faces, the sport style is gaining favour: the newer routes all have bolts.

While the popularity of rock climbing has grown, so has concern about its environmental impacts. Ever since Doug Larson and his colleagues at the University of Guelph discovered that the Escarpment's cliff ecosystem included a unique forest of old-growth cedars, concerns about protecting the cliff face ecosystem have grown.

Larson marshalled the assistance of climbers through the Alpine Club of Canada when he was asked to do core samples on cedars at Bon Echo Provincial Park. Since then, communications between Larson's Cliff Ecology Research Group and the climbing

community have been good. *"The Escarpment - - a Climber's Guide"*, published recently by Barnes, Oates and Marc Bracken, includes a chapter by Larson and Peter Kelly on the fragility and significance of the cliff ecosystem.

This summer, Peter Kelly will study the age structure of cedars at eight sites along the Escarpment -- four that are used for rock climbing and four that are not -- to determine the impact of the sport on cliff face ecology.

The trend toward European climbing with fixed bolts will also reduce climbing's impact. Placing and removing hardware again and again, often in fractures where vegetation is established, is more destructive to plant life than installing permanent bolts. (The bolts are also painted so they blend into the cliff face.)

Most Escarpment climbing takes place on public property, and liability concerns have prompted the Halton Region Conservation Authority to ask climbing school operators to sign a waiver. The Grey Sauble Conservation Authority asks climbers to apply for a permit to climb at Old Baldy. And climbing is not permitted in parks designated as provincial nature reserves.

The Access Committee of the Alpine Club of Canada is working with landowners to establish acceptable climbing sites along the Escarpment. Most people will continue to enjoy the Escarpment from the Bruce Trail. But for a growing number of climbers, the Niagara Escarpment is a "vertical" experience. 🐾

Lorraine Brown is a writer living in Leith, Ontario.



Ontario's Niagara Escarpment - A World Biosphere Reserve



Ontario's Niagara Escarpment stretches 725 km from Queenston, near Niagara Falls, to Tobermory, at the tip of the Bruce Peninsula. It was formed 450 million years ago along the shore of a shallow tropical sea that covered a vast area of Ontario and Michigan. Skeletons of primitive sea creatures and debris from ancient mountains were compressed into massive layers of reef and sedimentary rock. Over succeeding millions of years, erosion from glaciers, ancient rivers and lakes, and the elements sculpted the rock layers into their present form.

The Niagara Escarpment and lands in its vicinity — 183,000 hectares in eight counties and regions and 37 local municipalities — are regulated by the Niagara Escarpment Plan. Adopted by Ontario in 1985, it is Canada's first large-scale environmental land-use plan. The plan ensures that the Escarpment will be maintained substantially as a continuous natural environment. It strikes a balance between conservation, protection and environmentally compatible development.

The United Nations named Ontario's Niagara Escarpment a World Biosphere Reserve in 1990. This makes the Escarpment part of a network of protected samples of the world's major ecosystem types devoted to conservation of nature and scientific research in the service of humanity. Reserves provide a standard against which the effects of human impact on the environment can be measured. There are only six reserves in all of Canada.